REMARKS

In the Office Action, the Examiner indicated that claims 16 through 30 are pending in the application and the Examiner rejected all claims. By this amendment, applicant has amended claim 1 and cancelled claims 17, 19 and 20.

A. Support for the amendment to the independent Claim

The new text finds explicit support from para [0031]:

> Figure 5 shows an alternative way of deploying the wave energy device 10. In Figure 5, the wave energy device 10 is provided with positive buoyancy and it is restrained by **taut tethers 14a which hold the device 10 in the position relative to the mean water level 16** that is shown in Figure 5. The tethers 14a prevent heave motion of the wave energy device 10 and wave action causes the water level to rise and fall in the chambers 26 as in the deployment shown in Figure 1. **The tethers 14a are, to a certain extent, elastic so as to accommodate any rise and fall of the mean water level 16 due to, for example, tidal action.**

The §112 Rejection

On page 3 of the Office Action, the Examiner rejected claims 16-30 under 35 U.S.C. §112, first paragraph as failing to comply with the written description requirement. This rejection is respectfully traversed.

Meaning of the term 'wave base'

A proper understanding of the true operation of Youlton requires an understanding of the term 'wave base'.

The Examiner equates 'wave base' to 'water level'. This is an understandable error; the term 'wave base' is in fact a term of art that refers to the maximum depth at which a water wave's passage causes significant water motion. See http://en.wikipedia.org/wiki/Wave_base

It is therefore significantly below the water level. The examiner is requested to revisit Applicant's argument distinguishing over Youlton with this explanation in mind.

In the amendment to independent claim 1 submitted in the previous response in this application, Applicant states that the bottom of each chamber in the present invention is defined to be *above* the wave base. It has to be above the wave base, because the specification states that "As a wave crest approaches the device 10, the water level 32 within chamber 26 rises...." (page 7, line 19 of the PCT publication). This only happens if the bottom of the chamber is above the wave base.

Hence, Applicant believes that there is no added matter because it would be clear to the skilled implementer that the bottom of each chamber in the present invention must be *above* the wave base (i.e. the opposite of Youlton).

Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejection of claims 16-30 under 35 U.S.C. §112.

Rejections under 35 U.S.C. §§102 and 103

On page 4 of the Office Action, the Examiner rejected claims 16-21, 23-24, and 26-29 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,770,893 to Youlton. Also on page 4, the Examiner rejected claims 16-21, 23-24, and 26-29 under 35 U.S.C. §102 (b) as being anticipated by U.S. Patent No. 4,123,185 to Hagen et al.

On page 5 of the Office Action, the Examiner rejected claims 22, 25, and 30 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,770,893 to Youlton.

B. The prior art lacks relevance because it neither shows nor suggests the specific kind of 'taut' tethering system now defined by the independent claim

Applicant has further defined the manner by which the present invention achieves heave-resistance by specifying that heave resistance is achieved:

> "by including a tethering system that is under tension and that comprises tethers that are taut but that have sufficient elasticity to allow the device to accommodate a rise and fall of the mean water level around the device due to tidal action."

Achieving heave-resistance by including tethers that are taut, yet have sufficient elasticity to allow the device to accommodate a rise and fall of the mean water level around the device due to tidal action, is entirely novel.

In the prior art of record, there is no disclosure or suggestion of this claimed feature:

Youlton does not disclose this feature. Youlton has only very limited teaching as to how the wave energy device is tethered and the specific disclosures in fact teach away from the claimed features. This is because it states:

> "They could be moored by direct sea anchor, by catenary or rigid or fixed links to adjacent mooring buoys or other adjacent devices, by shore based lines, by attachment to shore or seabed anchored spines, by streaming from or containment within seabed based structures or from or within mobile vessels or oil rigs" column 7 lines 47 – 55.

Each listed item is addressed in turn. First, "**sea anchors**": a sea anchor does not anchor to the sea floor, but instead provides drag as it moves through the water. The elasticity of a line that connects the sea anchor to the vessel it is stabilising is important because the line acts as a shock absorber. But, because the sea anchor actually floats, the elasticity has nothing at all to do with accommodating a rise and fall of the tidal mean water level.

Secondly: "**catenary or rigid or fixed links to adjacent mooring buoys or other adjacent devices**": A catenary or rigid or fixed link can also not fairly be described as a

'tether that is taut'. Further, because these tethers are connected to floating devices such as buoys, any elasticity can also have nothing to do with accommodating a rise and fall of the tidal mean water level.

Next: "**shore based lines**": this says nothing about whether the connecting tether is taut or not; it says nothing about the elasticity of any tether accommodating a rise and fall of the tidal mean water level.

Next: "**by attachment to shore or seabed anchored spines**": this says nothing about whether the connecting tether is taut or not; it says nothing about the elasticity of any tether accommodating a rise and fall of the tidal mean water level.

Finally, "**by streaming from or containment within seabed based structures or from or within mobile vessels or oil rigs**": this says nothing about whether the connecting tether is taut or not; it says nothing about the elasticity of any tether accommodating a rise and fall of the tidal mean water level.

Hence, the amended independent claim recites a novel tethering arrangement for providing heave resistance.

C. Youlton must heave up and down with each passing wave: it cannot therefore use 'taut' tethers, nor be modified to use 'taut' tethers, since these would prevent this kind of heaving up and down with each passing wave

There is a further reason why Youlton lacks relevance. Applicant has, in its previous response[1], explained why Youlton must in fact heave up and down when waves pass it.

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[1] **Argument reproduced below:**

> Youlton discloses a wave energy device with tubes that are "generally disposed **below** the effective wave base" (See Abstract). Because the bottom of the tubes are below the

Applicant believes that the Examiner has not disagreed with this analysis. Taut tethers would prevent the extensive heaving which Youlton requires. So, although the tethers in Youlton may at times be under tension, they cannot be said to enable heave resistance by being taut.

Because it would not be possible to modify the Youlton tethers to make them 'taut', the present invention is also inventive over Youlton.

D. Hagen also lacks relevance because it neither shows nor suggests a 'taut' tethering system

Hagen also fails to disclose or suggest a tethering system that is under tension and that comprises tethers that are taut but that have sufficient elasticity to accommodate a rise and fall of the tidal mean water level.

In Hagen, the cables 15 in Figure 2 are clearly conventional catenary lines – these are not 'taut' lines at all. The use of a catenary clearly teaches away from a taut tether.

In any event, the cables 15 are not directly connected to the floating platform 11. Instead, they merely connect to a floating monobuoy 14. Floating platform 11 connects with the monobuoy using horizontal mooring lines 13b. So the elasticity of catenary cables 15

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effective wave base, there is no pressure head at the base of a tube when a wave is passing the device. When a wave passes the device, the buoy heaves upwards, but the water column in a tube does not rise in absolute terms because there is no pressure head at the tube base. Because the buoy heaves *upward*, the water column in the tube moves *down* relative to the buoy. It is this relative movement of the water column in each tube that drives the air movement in each tube. But it requires the buoy to heave.

.... Modifying Youlton to use a tension mooring is therefore not something the skilled implementer would ever do since it would defeat the primary design objective of Youlton, which is to heave.

cannot be said to allow the device to rise and fall with the mean water level around the device due to tidal action – the point of a catenary line is to accommodate the rise and fall due to tides by altering its shape.

E. Hagen also lacks relevance because the varying chamber draughts in Hagen tune the device to extract energy from different wave sizes[2]. The independent claim however requires varying chamber size to extract energy from different wave frequencies. Wave size is different from wave frequency.

F. **For completeness,** Applicant notes that the Examiner makes the argument that:

> "On page 2, lines 17 – 23, Applicant clearly discloses that "heave resistance" can be achieved by tethering the system to the sea bed and the system may rise and fall with tidal activity. Accordingly, because Applicant admits that his system does rise and fall with tidal activity, the cables in his invention are not different from the prior art".

Applicant traverses this for the following reason. Applicant does NOT disclose that "heave resistance" can be achieved by tethering the system to the sea bed. That would clearly be incorrect since, for example, a catenary line made of steel links that tethers a floating buoy to the sea bed clearly does not make the buoy heave-resistant – as waves pass the floating buoy, it moves up and down. Applicant instead says:

> For example, the vessel may be tethered **under tension** to, say, the sea bed.

The words 'under tension' are important here and correspond to the term 'taut'. It is only when a tether is taut that the required heave-resistance is achieved. Applicant hopes this clarification assists the Examiner.

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[2] "The wave energy collecting cells vary in depth for various wave *sizes*" Hagen col 2 lines 23 – 24.

The present claims are therefore both novel and non-obvious over both Youlton and Hagen.

Conclusion

The present invention is not taught or suggested by the prior art. Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejection of the claims. An early Notice of Allowance is earnestly solicited.

The Commissioner is hereby authorized to charge any fees associated with this communication to applicant's Deposit Account No. 50-4364.

Respectfully submitted

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